

# Assignment 1 | FPGA Lab

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## 1 Question

A training institute intends to give scholarships to its students as per the criteria given below :

- The student has excellent academic record but is financially weak.

OR

- The student does not have an excellent academic record and belongs to a backward class.

OR

- The student does not have an excellent academic record and is physically impaired.

The inputs are:

INPUTS

A: Has excellent academic record

F: Financially sound

C: Belongs to a backward class

I: Is physically impaired (In all the above cases 1 indicates yes and 0 indicates no).

Output : X [1 indicates yes, 0 indicates no for all cases]

Draw the truth table for the inputs and outputs given above and write the SOP expression for  $X(A,F,C,I)$ .

## 2 Solution

### 2.1 Truth Table

$A$	$F$	$C$	$I$	$\mathbf{X}$
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

### 2.2 SOP EXPRESSION

$$X = A.F' + A'.C + A'.I \quad (1)$$